

Preliminary Amendment
U.S. National Phase of PCT/EP2003/005049

Docket No. 9526-47

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) Method for ammonia production through a catalytic reaction of ~~pressurised~~ pressurized synthesis gas in an appropriate compressor with many stages(1, 2), each of which is equipped with an inlet and outlet (~~1a, 2a, 1b, 2b, 2c~~) for said synthesis gas, which method includes a purification step through liquid ammonia of said synthesis gas from water and carbon dioxide contained in it, ~~characterised in that~~ wherein said purification comprises the operating steps of:

arranging a gas-liquid mixer (~~16~~) in fluid communication, on one side with the outlet (~~1b~~) of a first stage (~~1~~) of said compressor or with the outlet of an intermediate stage thereof and, on the other side, with the inlet (~~2b~~) of a stage (~~2~~) immediately following said first stage (~~1~~) or said intermediate stage, said mixer (~~16~~) having a portion of reduced cross section, extending for a prearranged axial length[[],];

axially feeding into said mixer (~~16~~) a flow of synthesis gas outbound from said first stage (~~1~~) or from said intermediate stage at the same time as a flow of liquid ammonia, said flows being coaxial and in co-current[[],]; and

separating substantially anhydrous synthesis gas from the mixture of said flows outbound from said mixer (~~16~~) and sending said gas into said stage (~~2~~) following said first stage (~~1~~) or said intermediate stage.

2. (Currently amended) Method according to claim 1, ~~characterised in that~~ wherein said flow of synthesis gas is cooled to a temperature of between +8 [[]] and -20 C, before being fed into said mixer (~~16~~).

3. (Currently amended) Method according to claim 2, ~~characterised in that~~ wherein said cooling is carried out through a flow of liquid ammonia.

4. (Currently amended) Method according to claim 3, ~~characterised in that~~ wherein said cooling is carried out upstream of the inlet of said coaxial flows of synthesis gas and of liquid ammonia in said mixer (16).

5. Method according to claim 1, ~~characterised in that~~ wherein said flow of liquid ammonia is fed into said mixer (16) in the form of a plurality of high speed jets.

6. (Currently amended) Method according to claim 5, ~~characterised in that~~ wherein said flow of liquid ammonia is fed into said mixer (16) making it pass through a nozzle (23) equipped with appropriate suitably sized openings or slits.

7. (Currently amended) Apparatus for carrying out the method of claim[[s]] 1 to 6, comprising a compressor with many stages (1,2), each of which is equipped with an inlet and an outlet (1a, 2a, 1b, 2b, 2c), ~~characterised in that~~ wherein it comprises a gas-liquid mixer (16) in fluid communication, on one side with the outlet (1b) of a first stage (1) of said compressor or with the outlet of an intermediate stage thereof and, on the other side, with the inlet (2b) of a stage (2) immediately following said first stage (1) or said intermediate stage, said mixer (16) having a portion (16a) of reduced cross- section, extending for a prearranged axial length.

8. (Currently amended) Apparatus according to claim 7, ~~characterised in that~~ wherein a gas-liquid separator (8) is placed between said mixer (16) and said subsequent stage (2) of said compressor.

9. (Currently amended) Apparatus according to claim 8, ~~characterised in that~~ wherein at least one cooling group (19) is placed between said mixer (16) and said first stage (1) of said compressor.

10. (Currently amended) Apparatus according to claim 7, ~~characterised in that~~
wherein it comprises a nozzle ~~(23)~~ equipped with appropriate suitably sized openings or slits in
fluid communication on one side with said portion ~~(16a)~~ of reduced cross-section of said mixer
~~(16)~~ and on the opposite side with a line ~~(21a)~~ for feeding a flow of liquid ammonia into said
mixer ~~(16)~~.